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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,668	10/24/2003	Naveen Bali	5693P033	9966

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EXAMINER
ALI, MOHAMMAD

ART UNIT	PAPER NUMBER
2166	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

		Application No.	Applicant(s)
Office Action Summary		10/692,668	BALI ET AL.
		Examiner	Art Unit	
		Mohammad Ali	2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>16 October 2006</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-31</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-8 and 24-31</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>24 October 2003</u> is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. After further search and a thorough examination of the present application claims 1-8, and 24-31 remains rejected.

Applicants' arguments with respect to claims 1-8 and 24-31 have been considered, but they are not deemed to be persuasive.

First, Applicant's argue that Voigt fails to disclose 'each and every element of the claimed invention specifically a method comprising maintaining a log of a plurality requests in a storage server, each of the requests corresponding to a write operation to be performed by the storage server on a set of storage devices'.

In response to applicant's arguments, the Examiner respectfully submits that in particular, Voigt teaches this limitation as regardless of the RAID scheme or data storage scheme employed in a disk array, it is clear that the memory map 21 is generally in a constant state of change throughout system use. Thus, memory map log records are maintained and constantly posted from memory to disk by RAID management system 16 to ensure recovery of the same in the event of a loss of NVRAMs 21 and improved system performance for disk log writing by managing and distributing certain of the log writes to any least busy disk selected from across the multiple available disks 12, thus reducing contention for disk accesses between log I/Os and other I/O's in progress, see col. 4, lines 42-54, Voigt.

Second, Applicant's argue that Voigt fails to disclose 'maintain an entry count in the log to indicate the number of log entries'.

In response to applicant's arguments, the Examiner respectfully submits that in particular, Voigt teaches this limitation as sequence number 120 is a generated number that is sequentially incremented for each new record added to the transaction 'entires' log. Checksum 135 is a checksum of the whole record 110 and is used to validate the status of the record during transaction log recovery. Disk set identifier 125 is an arbitrary identifier of the current instance of the disk set that is associated with RLI 55, and is used to insure that "stale" (i.e., invalid) staging log 65 data, see col. 8, lines 28-35, Voigt.

Third, Examiner is entitled to give claim limitations their broadest reasonable interpretation in light of the specification.

Interpretation of Claims-Broadest Reasonable Interpretation

During patent examination, the pending claims must be 'given the broadest reasonable interpretation consistent with the specification.' Applicant always has the opportunity to amend the claims during prosecussion and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 162 USPQ 541,550-51 (CCPA 1969).

Reference is made to MPEP 2144.01 - Implicit Disclosure

"[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968)

Hence, Applicants' arguments do not distinguish over the claimed invention over the prior art of record.

In light of the foregoing arguments, the 102/103 rejections are hereby sustained.

Drawings

2. The informal drawings submitted on 10/24/2003, while acceptable for examination, fail to meet the requirements of 37 CFR 1.84 (l) & (p). Thusly, prior to an allowance formal drawings are required in compliance with 37 CFR 1.121(d). Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 8, 24 & 30 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,055,604 (henceforth referred to by "Voigt et al.").

Claim 1 is anticipated by Voigt et al. as follows: **A method comprising:**

maintaining a log of a plurality requests in a storage server (C4, L42-54), **each of**

the requests corresponding to a storage operation to be performed by the

storage server on a set of storage devices, the log including a separate log entry

for each of the requests (figure 7 [C2:L56-60] [C3:L40-42]); **and including a separate**

checksum in each of the log entries, each checksum for use by a checksum

algorithm in determining data integrity of the corresponding log entry (figure 7,

element 135 [C8:L15-32]).

Claim 2 is anticipated by Voigt et al. as in claim 1, **wherein the requests**

originate from a set of client devices serviced by the storage server ([C3:L40-42]

[C4:L25-29]).

Claim 8 is anticipated by Voigt et al. as in claim 1, **further comprising:**

maintaining an entry count in the log to indicate the number of log entries in the

log (figure 7, element 120); **and using the checksum of one of the log entries to**

determine whether the entry count is corrupted ([C9:L15-26] checking the entry's

checksum for corruption of the record entails a check of all of the data of the record,

which includes the sequence number).

Claims 24 & 30 are anticipated by Voigt et al. using the same rationale as applied

to claims 1, 2 & 8.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed

or described as set forth in section 102 of this title, if the differences between the

subject matter sought to be patented and the prior art are such that the subject

matter as a whole would have been obvious at the time the invention was made

to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negatived by the manner in which the invention was

made.

6.   Claims 3-7, 25-29 are rejected under 35 U.S.C. 103(a) as being unpatentable

over the combination of Voigt et al. and U.S. Patent No. 6,880,149 (henceforth referred

to as "Cronce").

Claim 3 is taught by Voigt et al. as in claim 1. However, Voigt et al. does not

explicitly indicate **selecting the checksum algorithm based on a desired balance**

between performance and checksum strength. Yet, Cronce teaches **selecting the**

checksum algorithm based on a desired balance between performance and

checksum strength (Cronce: [C5:L33-36] [C6:L56-58]).

One of ordinary skill in the art at the time of invention would have been aware of

the tradeoffs involved in using any single checksum algorithm (Cronce: [C5:L31-37]).

Thus, knowing that the loading of a storage system will be highly variable, and only

predictable to a limited extent, it would have been obvious to one of ordinary skill in the

art at the time of invention to have used a dynamic selection schema, as in Cronce, for

choosing the currently most suitable checksum algorithm for use in the log of Voigt et al..

Claim 4 is taught by Voigt et al. as in claim 1. However, Voigt et al. does not explicitly indicate **automatically selecting the checksum algorithm based on a predetermined criterion.** Yet Cronce teaches **automatically selecting the checksum algorithm based on a predetermined criterion** (Cronce: [C6:L5-8] a preference setting is a form of a predetermined criteria). One of ordinary skill in the art at the time of invention would have been aware of the tradeoffs involved in using any single checksum algorithm (Cronce: [C5:L31-37]). Thus, knowing that the loading of a storage system will be highly variable, and only predictable to a limited extent, it would have been obvious to one of ordinary skill in the art at the time of invention to have used a dynamic selection schema, as in Cronce, for choosing the currently most suitable checksum algorithm for use in the log of Voigt et al..

Claim 5 is taught by the combination or Voigt et al. and Cronce as in claim 4, **further comprising including an algorithm variable in the log to select the checksum algorithm from a plurality of selectable checksum algorithms, wherein said automatically selecting the checksum algorithm comprises selecting the checksum algorithm dynamically by modifying the algorithm variable during operation of the storage server** (Cronce: figure 4b, element 420 [C5:L23-25]).

Claim 6 is taught by Voigt et al. as in claim 1. However, Voigt et al. does not explicitly indicate **including an algorithm variable in the log to select the checksum algorithm from a plurality of selectable checksum algorithms; and automatically**

**selecting the checksum algorithm dynamically by modifying the algorithm
variable during operation of the storage server.** Yet Cronce teaches **including an
algorithm variable in the log to select the checksum algorithm from a plurality of
selectable checksum algorithms** (Cronce: figure 4b, element 420 [C5:L23-25]); **and
automatically selecting the checksum algorithm dynamically by modifying the
algorithm variable during operation of the storage server** (Cronce: [C5:L16-17]
[C5:L43-45]).

One of ordinary skill in the art at the time of invention would have been aware of
the tradeoffs involved in using any single checksum algorithm (Cronce: [C5:L31-37]).
Thus, knowing that the loading of a storage system will be highly variable, and only
predictable to a limited extent, it would have been obvious to one of ordinary skill in the
art at the time of invention to have used a dynamic selection schema, as in Cronce, for
choosing the currently most suitable checksum algorithm for use in the log of Voigt et
al..

Claim 7 is taught by Voigt et al. as in claim 1. However, Voigt et al. does not
explicitly indicate **including a separate algorithm variable in each of the log entries,
to specify a checksum algorithm to be used separately for each said log entry.**
Yet Cronce teaches **including a separate algorithm variable in each of the log
entries, to specify a checksum algorithm to be used separately for each said log
entry** (Cronce: [C5:L16-25]).

However Voigt et al. does not explicitly indicate **including an algorithm variable
in the log to select the checksum algorithm from a plurality of selectable**

checksum algorithms. Yet, Cronce teaches **including an algorithm variable in the log to select the checksum algorithm from a plurality of selectable checksum algorithms** (Cronce: figure 4b, element 420 [C5:L23-25]).

One of ordinary skill in the art at the time of invention would have been aware of the tradeoffs involved in using any single checksum algorithm (Cronce: [C5:L31-37]). Thus, knowing that the loading of a storage system will be highly variable, and only predictable to a limited extent, it would have been obvious to one of ordinary skill in the art at the time of invention to have used a dynamic selection schema, as in Cronce, for choosing the currently most suitable checksum algorithm for use in the log of Voigt et al.

Claims 25-29 are taught by the combination of Voigt et al. and Cronce using the same rationale as applied to claims 3 and 4.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Voigt et al..

Claim 31 is taught by Voigt et al. as in claim 24, **wherein the storage appliance is a network appliance** (Voigt et al.: [C1:L20-34]). It would have been notoriously obvious to one of ordinary skill in the art at the time of invention to have included network communications capabilities within the disk array data storage system of Voigt et al. since a data storage system that is not capable of communicating with the outside world would have an extremely limited functional capability, and as such one of ordinary skill in the art at the time of invention would have known to include network communication capabilities.

Conclusion

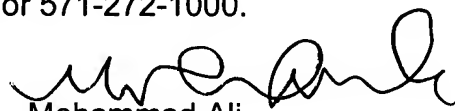7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad Ali whose telephone number is 571-272-4105. The examiner can normally be reached on Monday-Thursday (7:30 am-6:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain T. Alam can be reached on (571) 272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mohammad Ali
Primary Examiner

MA
April 9, 2007